This work will be published on a scale of four miles to the inch, with contours two hundred feet apart vertically.

Massachusetts division. — In July a survey of Massachusetts was begun, under the direction of Prof. H. F. Walling. In this work the triangulation of the coast survey and the old Borden survey, and the topographical work of the past, are being utilized wherever practicable. The maps will be comparatively detailed, as the published scale is to be two miles to the inch. It is hoped that the work may be completed in about two years. Thus far, during the present season, about two thousand miles have been surveyed, work having been begun in the western part of the state, and extended eastward from the high country as cold weather began to come on.

Rocky-mountain division. — Mr. Anton Karl has surveyed part of the Elk Mountains in Colorado, extending the map made by Hayden in 1874, and has also been engaged in re-surveying the Maxwell grant in northern New Mexico for the interior department.

Wingate division. — This division, in charge of Prof. A. H. Thompson, has its headquarters at Fort Wingate, N.M., and has been working in the plateau country, principally in north-eastern Arizona. Field-work was begun early in May, and is now practically finished for the season. One triangulation party and three topographic parties have been at work, and have surveyed twenty-two thousand square miles. The region they covered is one of the most dreary and desolate within the limits of the United States; and, when its arid condition and the difficulties of transportation through it are considered, it will be seen that this division has accomplished a remarkable amount of work.

California division. — Mr. Gilbert Thompson, who is in charge of this division, began work last year in northern California, and completed the survey of about four thousand square miles. This year the work was extended in all directions from Mount Shasta, reaching to the Coast Range on the west, and into the lava-bed country on the east and south-east. This region lies between the parallels 38 and 42, and meridians 121 and 123. Although the atmosphere was smoky a large part of the time, this division has had a successful season.

Division of the Great basin. — The topographic surveys in the Great-basin district have been confined mainly to detailed work for special maps illustrating Mr. G. K. Gilbert's investigations of the lake-basins of this region. The principal work done has been the securing of notes for a map of the drainage area of Mono Lake, and for a number of special maps of ancient moraines.

Yellowstone-park division. — Mr. J. H. Renshawe has just come in from the field. He has been engaged in work for a detailed map of the Yellowstone national park. He began work early in June, and has covered fifteen hundred square miles, making plane-table sketches on a scale of two inches to the mile. He also remeasured, at Bozeman, a base-line laid out by Wheeler's survey in 1877. Mr. Renshawe expanded this base-line last season, but was prevented from remeasuring it then by the weather.

In California Mr. John D. Hoffman has been carrying on the survey of the quicksilver-mines steadily for more than a year.

NOTES AND NEWS.

Last summer, at the Zurich meeting of the standing committee of the International geological congress, Professor Neumayr of the Vienna university presented, by request, a plan for the preparation of a 'Nomenclator palaeontologicus,' to be issued under the auspices of the congress. His project was well received, and only awaits final indorsement at the meeting of the congress next year at Berlin. The scheme contemplates the appointment of an editor-in-chief (for which post no better person than Professor Neumayr himself could be selected); an editing committee, under whose general supervision the work will be carried on; national collaborators, who are to give special assistance in the literature of their own country; and special compilers, to each of whom a particular section of the work will be confided, and who will be placed in special relation with some one member of the editing committee.

The work, when completed, will probably consist of fourteen or more large octavo volumes. The mollusks are expected to require at least two volumes; one each will be given to cryptogams, phanerogams, protozoa, coelenterates, echinoderms, worms and molluscoida, arthropods, and vertebrates; two volumes will be given to a systematic enumerator, and one to an alphabetical register.

The nomenclator proper will consist of citations of all species (the nominal species in special type) published in scientific works, in accordance with recognized rules, with their synonymes; and the citations will include, *a*, the first publication; *b*, later descriptions which have really advanced the paleontological knowledge of the species, particularly such as give for the first time a satisfactory illustration; *c*, the illustrations found in the best known and most widely circulated 'fundamental work.'

Critical notes and newly proposed names will not be admitted, and conventional signs will be avoided. Abbreviations in the citations will be so given as to be readily understood by every one possessing some knowledge of the literature; and, for serial publications, the use of those employed in the Royal society's Catalogue of scientific papers is recommended. The geological horizon and geographical distribution will be indicated, the former according to the scale of the congress. The language employed will be Latin.

The plan, as presented by Professor Neumayr, is excellently conceived, and, if carried out in the same spirit, will be an immense boon to paleontologists. But one minor criticism occurs to us: it seems a pity to perpetuate the awkward abbreviations employed in the Royal society's Catalogue, in which are too frequently violated the two cardinal rules of proper abbreviations, — the preservation of the order of words

in a title, and, in ordinary cases, the abbreviation of words before the vowel of the second syllable. If those in charge of the compilation of that magnificent but exasperatingly incomplete work had but taken counsel of some of their better trained brethren of the Index society, the world would have had more to thank them for. As it is, their shortcomings seem likely to breed perpetual sorrow.

— On the 28th of July, about nine o'clock in the morning, a Mr. Ferry started from Dover to cross the English Channel on a water tricycle. The construction of the machine is well shown in the accompanying illustration, which we take from *La Nature*. It is evident, however, that the displacement must have been much greater than that indicated. Instead of the light wheels of steel, with tires of rubber, of the land vehicle, there are bulky paddle-wheels. The small wheel behind serves as a rudder. Ferry arrived at Calais in less than eight hours. The distance as a bird flies is twenty miles, but on account of the currents the exertion required was considerably increased.

TRICYCLE ON WHICH MR. FERRY CROSSED THE ENGLISH CHANNEL.

— Mr. Boyd Dawkins, who has long been familiar to American archeologists through his cave explorations, and his volume on early man in Britain, discusses in the *North American review* the question of the antiquity of man in our own country. The subject is treated as a portion of one great problem common to the old and the new world, when man lived in the same low stage of culture on both sides of the Atlantic, at a time when the hands of the geological clock pointed to the same hour over the greater part of the world. With reference to the absolute chronology of geological phenomena, the author makes a statement worth preserving: "The present rate of the retrocession of the Falls of Niagara, or of the deposit of Nile mud, or of stalagmite in caverns, or of the accumulation of rocks themselves, or of the movement of glaciers, has been formerly used as a natural chronometer, on the assumption that they have been going on at the same rate throughout the past, and have been warranted never to stop, or to want winding up, or to go faster or slower than at the moment the observer was looking at them." The chronology adopted in the present paper is that of the author's 'Early man in Britain.' In the light of Dawkins's system, Professor Whitney's pliocene man is found wanting. Skulls of Mexican mustangs and modern stone implements are taken from the same layers. The human bones in the auriferous gravels are indistinguishable from those of the red Indians.

With reference to Dr. Abbott's Delaware River finds, the author remarks, "The identity of the implements proves that the river-drift hunter was in the same rude state of civilization in the old and the new world, while the hand of the geological clock pointed to the same hour." This river-drift man was unmistakably a man, and not a 'missing link.'

— From advanced sheets of the Proceedings of the Anthropological society of Washington, Col. F. A. Seely, of the U. S. patent office, publishes a pamphlet entitled 'An inquiry into the origin of invention.' The author is accustomed, day by day, as new claims for patents come before him, to eliminate the successive steps in the classes of machinery until he reaches the fundamental idea. This is the plan pursued in tracing backward the whole subject of invention to its sources in the mind of primitive man. The subject is illustrated, first, by the story of the steam-engine, and then by the examination of the bow and arrow and other implements of the lower races. The author rejects Professor Gaudry's Dryopithecus, and affirms, "Obviously, archeology can find no trace of a remoter age than that of stone; but I mistrust that the thoughtful anthropologist will accept the

evidence of earlier ages, one of which, taking one of its perishable materials as the type of all, we may call the age of wood. Still farther back must lie an age, as indefinite in duration as any, when man existed in his rudest condition, without arts of any kind, except such as he employed in common with lower animals; and this is the true primitive period."

— In the Bulletin of the *Société géogr. de Marseille* for June, Heckel gives new information, with a *résumé* of old, in regard to the African nut known as Kola, or Guru. This seed, which is hardly to be called a nut, has a kernel about two inches in length, somewhat like that of a peanut, with a groove instead of a projecting point at the germinal end. It may be white or red, or both, to the number of four or five, in the same rough brown pod. It is the product of a tree of the family Sterculiacea. The genus has been called Sterculia, Kola, etc., and there are several species or varieties. This nut, or seed, is remarkable on account of containing (beside glucose, tannin, and a bitter principle) caffeine and theobromine in large proportion. Among the African tribes it takes the place of tea and coffee or cocoa, — products of plants belonging to very different groups, but valued for the same essential principle. It has been used from time immemorial, and many singular stories have been current as to its effect upon the system, though little authentic information was at hand.

Kola is gathered twice a year, carefully shelled, and the bare meats are immediately despatched into the interior, carefully wrapped in green leaves to insure them from drying. They have to be carefully picked over every twenty or thirty days, and all defective ones thrown out. It is considered very important that they should be kept fresh and somewhat moist. However, as soon as they begin to shrivel and dry up, the caravan merchants dry them thoroughly in the sun, and pound them to a powder in a mortar. The seeds are worth twenty or thirty cents a pound at the place where gathered, near Sierra Leone; but they rapidly increase in value away from the original market. At Goree a single seed will be sold at six to ten cents, according to the state of the market. In the interior the tribes on the Niger pay as high as one dollar per seed, and in times of scarcity a slave has been given for one seed. In the far interior the Arab merchants frequently dispose of the powder for its weight in gold-dust.

The Kola is the stimulant of the African tribes, and is in order on every occasion. Among those peoples where the nut is not indigenous, nor yet too extravagantly dear, no transaction of any moment can take place without an exchange of Kolas. This is either in token of good will or to 'bind the bargain.'

If two tribes ally themselves, they exchange white Kolas, this color being always the token of good will and peace. If war is declared, the announcement is made by sending red Kolas to the enemy. A request for a wife is accompanied by the present of a white Kola from the lover to the intended mother-in-law. The response favorable is by a seed of the same color; a refusal, by a red one. The wedding present of the husband to his bride is incomplete without a certain proportion of Kolas. In the interior, where they are so valuable, the gift of one is considered a high attention, and, when given by a chief to a white traveller, takes the character of an assurance of protection. One of the chiefs of the upper Niger sent Zweifel and Mousteir red Kolas wrapped in green leaves as a sign that they would not be permitted to ascend certain sacred water-courses included in their programme.

In religious and judicial proceedings they are equally important. All oaths are taken on these seeds: the witness holds his hand over them, swears, and then eats them. An accuser demanding justice brings to the judge a little basket of rice with four or five Kolas upon it. The sorcerers lay great stress on the attractive qualities of this seed in drawing away evil spirits, sickness, and misfortune. Friends place with the dead some Kolas, that he may safely endure his 'long journey;' and, to crown all, the Mahometans declare it to be a fruit of divine origin, brought to earth by the Prophet himself.

The nut is chewed as if it were tobacco; the powder is eaten. The taste is sweet, astringent, and bitter in succession. Europeans as well as negroes are devoted to it. It not only sustains the system under the greatest fatigues, even without food and for long periods, but it is also a certain preventive of the dysenteries and deadly fluxes which render that region so unhealthy. The powder makes foul water drinkable and harmless. The negroes, without sufficient cause, regard it as an aphrodisiac; and for this reason, in Martinique, in the botanical garden, where there is a plant brought from Africa, the director has never been able to save a single seed for propagation.

— Apropos to Professor Leidy's interesting article in No. 43, a correspondent draws our attention to the fact that the botanists have not overlooked the crystals in the bark of forest-trees. See, for example, Gray's Botanical text-book, from second to fifth editions, in which those in the bark of the locust-tree are mentioned, and those of hickory figured.

— Dr. A. Graham Bell has reprinted in pamphlet form, from the 'American annals of the deaf and dumb,' a very interesting account of the method followed by him in teaching a boy, deaf from his birth, to read the written language and to write English himself. The child was five years old when the course of instruction described began, and had received only three weeks' private instruction from the principal of the Boston school for the deaf and dumb. About a year later he was able to write a letter to his mother, which, to be sure, contains many mistakes, and is not always readily intelligible in its sentences, but which yet shows that he could already communicate with others in writing. The author gives specimens of such letters written without assistance. One cannot read these few pages without a strong feeling of admiration for the ingenuity and patience displayed in producing such a result, which shows how much can be done for the early education of the deaf and dumb.

— Mr. Estaban Duque Estrada, a native Cuban, has made an extended investigation of the useful qualities

of the best Cuban woods, with a view to exhibiting the resources of his country in this direction, and to the opening of our markets to his native timber. The research was made in the mechanical laboratory of the department of engineering of the Stevens institute of technology, and included the determination of moduli of resistance in tension, torsion, and compression, as well as for transverse loading. The woods are specified by their Cuban and by their botanical names, and can thus be identified. The first part of the work is now published; and the moduli of elasticity found for forty woods of sixteen distinct species are given, together with a full description of the apparatus, and the methods of test. These moduli are all high, and run very uniformly, usually above two millions. But one (Caoba) falls under a million and a half. The stiffest woods are the Dagame (Colycophyllum candidissimum) and the Jiqui Comun (Bumelia nigra), which have a modulus of two millions and a half.

The woods described are nearly all hard, strong, heavy, highly colored, taking a handsome finish, and excellent for constructive purposes. Some of them are not liable either to decay, or to injury by insects. They seem quite likely, should they become known through Mr. Estrada's work, to prove exceedingly valuable additions to the stock of available woods for the American market; and their introduction is likely to afford a valuable commerce, if it is properly encouraged by our own consular department and the Cuban officials. A full account of this part of the investigation is given in *Van Nostrand's magazine* for November.

— The Johns Hopkins university circular for November announces the resignation of Professor Sylvester from the chair of mathematics, and his early return to Europe. His loss to this country will be keenly felt by our mathematicians, for his presence and activity have given mathematical studies a remarkable stimulus in this country. We notice, in the December number of the *American journal of mathematics*, so long conducted by Professor Sylvester, the name of Dr. Craig given as assistant editor, which we trust indicates that it will be continued by the latter after Professor Sylvester's departure. The Johns Hopkins university has recognized the value of Professor Sylvester's services by electing him *professor emeritus*, and by passing resolutions in which the board of trustees "cordially extend to him its hearty thanks for the invaluable services which he has rendered to the university, and also its profound sense of the great ability, the conscientious fidelity and untiring energy, with which he has discharged the arduous duties of his chair, thereby elevating the science of mathematics to its proper plane, not only in this institution, but in this country."

The circular also announces the acceptance by Dr. Paul Haupt, professor of Assyriology in the University of Göttingen, of a call to the Johns Hopkins university as professor of the Shemitic languages. Dr. Haupt has already commenced his work, and has classes organized in Hebrew, Arabic, Assyrian, Ethiopic, and Sumero-Accadian.

— Killingworth Hedges described to the British association the fire risks of electric lighting, and is thus reported in *Nature*. There is a great difference between the electric currents which have been in constant use for telegraphic purposes and those which are to be supplied by the undertakers under the Electric-lighting act. The latter can be said to be free from danger only when the heat generated by the current is utilized in its right place, and not developed in the conductors or wires which lead the electricity to the incandescent lamps. The Fire-risk committee have already issued rules for guidance of users of electric light. These can hardly be said to embrace all the salient points of the new subject, which can only be arrived at after years of practical work. The necessity of proper regulations has already been recognized by the insurance-offices, both in the United States and Germany; and some of their special rules are given in this paper. The conductors must be properly proportioned for the current they have to carry. Whatever resistance there is in the conductor will cause a corresponding development of heat, which will vary with the amount of electricity passing, and inversely as the sectional area. As the temperature in Dr. Matthiessen's experiments upon the subject was not increased over 100° C., the author has made some further experiments, heating the wires by the electric current from a secondary battery to within a few degrees of their melting-point. Various materials were tried; the wires and foils having such sectional area, and being so arranged, that, on the current being increased by twenty per cent, they were immediately fused. The total length of each experiment was twenty-four hours, during which time the current passing through varied slightly. The results of the experiments were given.

— Mr. Joseph Thacher Clarke is giving a course of three lectures on classical archeology before the Johns Hopkins university, in one of which the recent work at Assos, under his direction, will receive special attention.

— On Nov. 13 the Arlberg tunnel, the third largest not only in Europe but in the world, was opened. It was not exactly the formal opening which took place Nov. 13 (this was celebrated Nov. 20), but the sounding-rod (three metres long) of the powerful boring-machine penetrated from the west side to the east gallery. A mass of rock sixty centimetres thick still separated the two galleries. One gallery was driven from St. Anton, on the Tyrolese side, and the other gallery from Langen in Vorarlberg. Both galleries sloped upward into the mountain; the Tyrolese rising two feet in a thousand, the steeper Vorarlberg fifteen feet in a thousand. When the Tyrolese section had penetrated 4,102 metres, it was continued downwards at the grade of the eastern end, the point of intersection lying nearer the west than the east mouth of the tunnel. As with the St. Gothard tunnel, there was but one mistake in the measurement, the length of the tunnel being three metres less than was computed.

The construction of the tunnel (10,263 metres long was begun June 22, 1880, by hand, and Nov. 13 of

the same year, machines were introduced; so that an opening was made just three years to a day from the first time that the point of the drill, driven by compressed air, was forced into the gneiss of the Arlberg. The laying of the road is to be completed in six months, so that business may be conducted about the middle of May.

The St. Gothard tunnel is 14,900 metres long. The boring in Airolo and Göschenen began in 1873. After seven and a half years' work, the last layer of rocks was broken through Feb. 29, 1880; and June 1, after nine years and a quarter consumed in its construction, the road was opened to commerce. The Mount Cenis tunnel (12,323 metres long) was built in fourteen years and a quarter.

With the completion of the Arlberg tunnel by the union of the Adriatic Sea and Europe's granary, Hungary, a further connection is established with the heart of the continent. The Arlberg road, therefore, has not only for Austria-Hungary, but more especially for Switzerland, great commercial and political significance.

— Dr. H. Newell Martin, of Johns Hopkins university, gave, in November, four lectures on the minds of animals, before the Peabody institute of Baltimore, covering the subjects of instinct and reason, the emotions and moral sense, in animals.

— *La Nature* presents an illustration of the new form of equatorially mounted telescope, lately set up at the observatory of Paris, in which the tube of the instrument is bent at right angles; one portion of it constituting the polar axis of its mounting, and the other moving thus in the plane of the equator. The rays of light from any celestial object are brought to the eye of the observer after reflection from two mirrors, the loss of light from which is said to be inappreciable. This form of mounting does away with the customary dome covering the equatorial; and the observatory may be said to consist of two parts, — the movable one, covering the object-glass end of the telescope; and the fixed part, that in which the observer sits and makes his observations, completely protected against the weather. The new instrument is the most powerful one at the Paris observatory, and was built by MM. Eichens and Gauthier, and the brothers Henry. The form of construction is due to M. Loewy, and it has been built through the liberality of M. Bischoffsheim.

— In a late number of *Naturen*, Dr. Geelmuyden has a paper entitled 'Om Islaendernes gamle kalendere,' or the ancient calendars of the Icelanders, the chief peculiarity of which lay in the regarding of the week as the unit of measurement of time. There was also a year of fifty-two weeks, or three hundred and sixty-four days, as also twelve months of thirty days each; the last of these coming in the summer, and having the *Sumar-auke*, or summer addition of the four extra days. The half-years were called *misseri*, and were more frequently employed as a measurement of time than the full year itself. About the year 1000, when Christianity was introduced into Iceland, the calendar of that nation was modified into a near approximation to the Julian calendar; and early in the year 1700 the new style of reckoning was adopted in Iceland, at the same time with Norway and Denmark.

— The following persons, formerly connected with Johns Hopkins university, have received recent appointments: Edward Barnes, professor of the higher mathematics in the Rose polytechnic institute, Terre Haute, Ind.; William C. Day, professor of chemistry and physics in St. John's college, Annapolis; George S. Ely, professor of mathematics in Buchtel college, Ohio; Kakichi Mitsukuri, professor of zoölogy in the University of Tokio, Japan; William A. Noyes, professor of chemistry in the University of Tennessee; and William T. Sedgwick, assistant professor of biology in the Massachusetts institute of technology, Boston. It is also stated by the *Nation* that Dr. C. S. Hastings has received the appointment to the chair of physics in the Sheffield scientific school of Yale college, New Haven.

— Dr. John Rae writes in the *Athenaeum*, "In the *Athenaeum* of the 28th of July there is an extract from a letter of Capt. H. P. Dawson, to the following effect: 'On inquiry, I find that all the far-off Indians describe stone pyramids or altars on the tops of some of the hills far to the north and east of this, . . . composed of blocks of roughly hewn stone of a size such that the men of these days cannot lift. . . . The Indians look upon these remains with great dread, and will not go near them.' I do sincerely hope that Capt. Dawson may discover something new on these reported monuments of 'roughly hewn stone;' but I fear they will be found to be the well-known work of the Eskimo, who, where the country is hilly and rocky, delight in putting up stones of very considerable size — although not larger than a few men can lift — in all sorts of picturesque forms, especially in the neighborhood of a favorite camping-place. An excellent illustration of these Eskimo constructions may be seen in the narrative of Sir George Back (facing p. 378), describing his descent of the Great Fish River in 1834. The Indians, unless they are in great numbers, have a very wholesome and wide-spread fear of the Eskimo, and therefore have a 'great dread of going near these remains,' thinking they might meet the people who built them."

— Professor William Trelease, of the University of Wisconsin, will give four lectures in January, upon the fertilization of flowers, before the Johns Hopkins university.

— It is stated in *Nature* that the meeting of the Linnean society of London for Dec. 6 was to be exclusively devoted to the reading of a posthumous essay on instinct, by the late Mr. Darwin. The essay was said to be full of important and hitherto unpublished matter with regard to the facts of animal instinct considered in the light of the theory of natural selection; and, as the existence of the essay has only now been divulged, this meeting of the Linnean society must have been of an unusually interesting character.

— Prof. S. P. Langley, of Allegheny observatory, will give six illustrated lectures next February, on the sun and stars, before the Peabody institute of Baltimore.